

when the substrate is exposed to a magnetic field generated by a coil and when the substrate is not exposed to the magnetic ^{field} generated by the coil wherein the tuned circuit is connected to a phase locked loop comprising a driver which generates a driving signal for driving the tuned circuit, and a phase comparator for determining the phase difference between the driving signal and an output signal obtained from the tuned circuit, the difference in resonant frequency being determined by monitoring the performance of the phase locked loop.

REMARKS

Claims 1-13 and 15-26 are pending in this application. Claims 1-8 and 15-26 have been withdrawn from consideration. By this Amendment, claim 9 has been amended to distinguish over the applied references and claim 14 has been cancelled. Reconsideration in view of the foregoing amendments and following remarks is respectfully requested.

I. Formal Matters

The Office Action rejects claims 9-14 under 35 U.S.C. §112, second paragraph. The rejection of claim 14 has been rendered moot by the cancellation of this claim. Claim 9 has been amended to obviate the rejection. Claims 10-13 are rejected on the basis of their dependency upon claim 9. Therefore, Applicant respectfully request that the rejection of claims 9-13 under 35 U.S.C. §112, be withdrawn.

II. Claims Define Patentable Subject Matter

The Office Action rejects claims 9-11, 13 and 14 under 35 U.S.C. §103(a) as unpatentable over U.S. Patent 6,110,660 to Kritz et al. in view of U.S. Patent 5,978,694 to Rapoport. The rejection of claim 14 has been rendered moot by the cancellation of this claim. However, as the rejection applies to claims 9-11 and 13, it is respectfully traversed.

In particular, Applicant submits that neither of the applied references suggest

or disclose a method of performing a binding assay by determining the number of magnetic particles bound to a substrate, the method comprising immobilising a layer of molecules to a substrate, providing a number of magnetic particles as labels, performing a reaction using the molecular layer so as to bind at least some of the magnetic particles to the substrate and determining the number of magnetic particles bound to the substrate by determining the difference in the resonant frequency of a tuned circuit when the substrate is exposed to a magnetic field generated by a coil and when the substrate is not exposed to the magnetic field generated by the coil, wherein the tuned circuit is connected to a phase locked loop comprising a driver which generates a driving signal for driving the tuned circuit and a phase comparator for determining the phase difference between the driving signal and an output signal obtained from the tuned circuit, the difference in resonant frequency being determined by monitoring the performance of the phase locked loop, as recited in amended claim 9.

In contrast to the claimed invention Kritz instead teaches a Maxwell bridge circuit including a coil for transducing a magnetic permeability signal and a sample. At col. 10, lines 41-44, Kritz teaches away from measuring resonant frequency. Moreover, Kritz must be used with ferromagnetic markers rather than paramagnetic markers. The circuit of Kritz is incapable of detecting the paramagnetic marker particles recited in the claimed invention. At col. 3, line 15, Kritz states that his method can only detect markers having a relative permeability of at least of about 600 which would exclude paramagnetic markers. Applicant submits that claim 9 is patentable over Kritz.

*assertion
no proof
that 600
are not
paramagnetic*

— The Office Action relies on Rapoport to teach measuring the difference in resonant frequency when the substrate is exposed to a magnetic field and when the substrate is not exposed to the magnetic field. However, Applicant respectfully submits that Rapoport fails to supply the deficiencies of Kritz as discussed above. Therefore, Applicant submits that claim 9 is patentable over the combination of applied references. Claims 10, 11 and 13 are also patentable over the combination of applied references for at least the same reasons as

claim 9 and for the additional features recited therein. Accordingly, Applicant respectfully request that the rejection of claims 9-11 and 13 under 35 U.S.C. §103(a), be withdrawn.

III. Conclusion

In view of the foregoing amendments and remarks, Applicant submits that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 9-13 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned representative at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Phillip D. Mancini
Registration No. 46,743

JAO:PDM/kys

Attachments:

Petition for Extension of Time
Appendix

Date: February 21, 2003

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
--

APPENDIX

Claim 14 is canceled.

The following is a marked-up version of the amended claim:

9. (Amended) A method of performing a binding assay by determining the number of magnetic particles bound to a substrate, the method comprising:
- a. ~~immobilising~~immobilizing a layer of molecules to a substrate;
 - b. providing a number of magnetic particles as labels;
 - c. performing a reaction using the molecular layer so as to bind at least some of the magnetic particles to the substrate; and,
 - d. determining the number of magnetic particles bound to the substrate by determining the difference in the resonant frequency of a tuned circuit when the substrate is exposed to a magnetic field generated by a coil and when the substrate is not exposed to the magnetic field generated by the coil wherein the tuned circuit is connected to a phase locked loop comprising a driver which generates a driving signal for driving the tuned circuit, and a phase comparator for determining the phase difference between the driving signal and an output signal obtained from the tuned circuit, the difference in resonant frequency being determined by monitoring the performance of the phase locked loop.